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Clinical Peculiarities of Recurrent and Chronic Bronchitis in Children (Part 1)

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Abstract.

Subjective manifestations in children with recurrent and chronic bronchitis were the subject of the research.

The objective of the research was to evaluate the main clinical manifestations of recurrent and chronic bronchitis, analyze risk factors and preconditions for their occurence in children.

Materials and methods of research. The comprehensive clinical and anamnestic examination of 120 children with bronchopulmonary pathology at the age of 3 to 18 (average age was 10.5±1.1 years) was conducted. There were 80 patients with recurrent bronchitis, 30 – with chronic bronchitis and 30 healthy children of the same age. Detailed assessment of complaints and clinical manifestations of disease in exacerbations and remissions of the pathological process was provided, past medical history and case history were analyzed with identification of main diagnostic criteria for each nosology and risk factors, preconditation for their development and progression. A number of symptoms observed in recurrent bronchopulmonary pathology were singled out. They included nonspecific toxicity syndrome (fever, weakness, atony, decreased appetite, fatigue) (in 85.2% of children with recurrent bronchitis and in 91.3% of children with chronic bronchitis), respiratory failure (up to 50.0% of children with recurrent bronchitis and almost in all with chronic bronchitis) and cough (90.0% of children with recurrent bronchitis and in all children with chronic bronchitis). Some differences in the clinical picture of bronchitis with recurrent and chronic course in children were determined and their clear dependence from the stage of the disease was shown. Such knowledge will allow to use a differentiated approach to treatment and prevention of patients with different clinical types of bronchitis.

Keywords: chronic bronchitis; recurrent bronchitis; children; clinical features.

The problem statement and analysis of recent research

Diseases of respiratory system predominate in the structure of childhood pathology (66.75 %), moreover bronchitis ranks the first place among them and constitutes 75-250 cases per 1000 children per year, mostly in acute and recurrent forms. Today, ambiguity of prognosis in case of recurrent bronchitis (RB) in children is the main medical problem. Thus, recovery is observed only in 75.0-80.0% of cases, while the rest of cases changes into chronic bronchitis or asthma [2]. Therefore, from clinical medicine standpoint, recurrent bronchitis singling out as transitional form is necessary means which provides dynamic monitoring and differentiated treatment and rehabilitation in children not just with repeated cases of acute bronchitis, but with compromised background and high risk of chronic pathology development [3].

The problem of chronic bronchitis (CB) in children is still relevant. The prognosis of chronic bronchitis is always serious as inflammation in cases of CB is bilateral and diffuse, leads to irreversible changes in the lungs with the development of respiratory failure. Modern advancements have changed the understanding about the causes of chronic process in the lungs recognizing bronchopulmonary malformations and harmful environmental factors such as microenvironment, active and passive smoking as the most important [5,9]. However, the role of recurrent processes in the bronchopulmonary system in cases of their late diagnosis and wrong therapeutic approach is undeniable concerning preconditions of process chronization.

Despite significant advances in the diagnosis and treatment of bronchopulmonary system diseases, many questions are still disputable. First of all, these are issues of terminology, peculiarities of age-related evolution, early diagnosis and preconditions of transformation into chronic disabling pathology in adults.

Thus, improvement of early diagnosis methods to prevent the formation of chronic inflammation in the lungs, advancement of treatment and prevention of recurrent and chronic bronchitis may provide possibilities to reduce their prevalence, improve the prognosis and quality of life of sick children.

The objective of the research was to evaluate the main clinical manifestations of recurrent and chronic bronchitis and analyze risk factors and preconditions for their occurrence in children.

Material and method of research

The research was conducted at the premises of the Pulmonology department and Advisory Clinic at Ivano-Frankivsk Regional Children's Hospital.

The comprehensive clinical and anamnestic examination of 120 children with bronchopulmonary pathology at the age of 3 to 18 (average age was 10.5+1.1) was conducted. Depending on the nosology the children were divided into the following groups: 80 children with recurrent bronchitis (RB), 30 children with chronic bronchitis (CB). Control group consisted of 30 practicallyhealthy children who were admitted to the nephrology department and who did not have any complaints or bronchopulmonary pathologies.

Recurrent bronchitis (RB) and chronic bronchitis (CB) were diagnosed according to the order of the Ministry of Health of Ukraine№18 from13.01.2015 about approving protocols of care for children with a specialization in "paediatric pneumology".

Detailed assessment of complaints and clinical manifestations of the disease in remission and exacerbations of the pathological process was conducted; past medical history and case history were analyzed with identification of main diagnostic criteria for each nosology and risk factors for their development and progression.

During our research we strictly complied with general principles of GCP, fundamental principles of the European Convention on Human Rights, Ethical Principles for Medical Research according to Declaration of Helsinki, European Convention on Human Rights and Biomedicine (1977), corresponding guidelines the World Health Organization, International Code of Medical Ethics (1983) and the Laws of Ukraine.

Results of research

Nonspecific intoxication was observed in 85.2% of children with RB and 91.3% of children with CB. Temperature rise at the disease onset was observed in 85.0% of patients with RB and 75.0% of patients with CB. However, when pyretic fever was detected in 36.7% of patients with RB, it was almost not found in children with CB ($p<0.05$). Low-grade pyrexia was more characteristic of patients with CB and comprised 73.3% versus 48.3 % of children with RB ($p<0.05$) (Table 1).

Table 1

Description of subjective manifestations in children with respiratory infection in the exacerbation period

Complain	CB (n=30)	RB (n=80)	p
Cough:	30 (100.0)	72 (90.0)	>0.05
– dry	6 (21.7)	13 (16.7)	>0.05
– wet	22 (73.3)	59 (73.3)	>0.05
– productive	21 (70.0)	51 (63.3)	>0.05
– unproductive	2 (6.6)	10 (10.0)	>0.05
– paroxysmal	3 (10.0)	3 (3.3)	>0.05
– no cough	-	5 (6.7)	>0.05
– in the morning	6 (20.0)	12 (15.0)	>0.05
– in the evening	4 (13.3)	9 (11.7)	>0.05
– during the day	17 (58.3)	37 (46.7)	<0.05
– at night	2 (6.7)	16 (20.0)	<0.05
– painful	22 (73.3)	22 (27.5)	<0.05
– unpainful	8 (26.7)	58 (72.5)	<0.05

– with vomiting	5 (15.0)	1 (1.7)	<0.05
Dyspnea: - at rest	25 (83.3)	24 (30.0)	<0.05
– during exercise	30 (100.0)	40 (50.0)	<0.05
Hyperthermia:	23 (75.0)	68 (85.0)	>0.05
– hectic	1 (3.3)	24 (30.0)	<0.05
– high	-	5 (6.7)	<0.05
– low-grade pyrexia	22 (73.3)	39 (48.3)	<0.05
Weakness	23 (76.6)	51 (63.3)	<0.05
Loss of appetite	18 (60.0)	40 (50.0)	>0.05
Catarrhal symptoms	11 (36.6)	72 (86.2)	<0.05
Sleep disturbance	17 (56.6)	39 (48.3)	>0.05

Notes. 1. The data are presented in total numbers, the percentage is given in brackets.
2. P – the probability of differences between patients with recurrent and chronic bronchitis.

Moreover, 21.7% of patients suffered from long-term low-grade pyrexia (for four-five weeks or more). Loss of appetite, sleep disturbances were not largely different in the groups and occurred in about half of patients regardless of bronchopulmonary pathology nature.

Children with CB in the exacerbation period complained of cough more often. Such patients constituted 100.0% versus 90.0% in the group with RB. Wet cough occurred in 73.3% of patients with CB being unproductive with the release of a small amount of mucous in 61.7% of them and in 73.3% of children with RB (66.3% of children suffered from productive cough with small amount of mucoid sputum). 7% of children with RB suffered from unproductive cough that occurred rarely. In addition, 16.6% of children with RB complained of occasional productive cough with mucoid or mucopurulent sputum, 26.7% of children in this group suffered from cough accompanied by chest pain. Vomiting during cough occurred in 15.9% of patients with CB, while such symptom was not typical for children with RB ($p<0.05$). The cough in patients with bronchopulmonary pathology with recurrent course occurred most often during the day. However, it appeared in the morning after awakening in 15.0% of children with RB and in 20.0% of children with CB, night cough was common for one fifth of patients with CB ($p<0.05$). Cough as the main symptom was not observed in 10% of children with RB.

Dyspnea at rest in the exacerbation period was found in 30.0% of patients with RB and 83.3% of patients with CB, and increased to 50% in the group with RB and to 100% in children with CB during exercise. The dyspnea was commonly of a mixed origin and was perceived by children as a feeling of shortness of breath, chest tightness, difficulty during inspiration, etc.

Exacerbation of bronchopulmonary pathology was accompanied by catarrhal symptoms in 86.2% of patients with RB and 60.0% of patients with CB ($p<0.05$). Qatar occurrence preceded the main symptoms.

Remission in patients with bronchopulmonary pathology was characterized by regression of the main clinical manifestations. However, the part of complaints was present in this period as well and was clearly defined by nosology variant (Table 2).

Table 2

Description of subjective manifestations in children with respiratory infection in remission

Complain	**CB (n=30)**	**RB (n=80)**	**p**
Cough:	28 (93.3)	13 (16.3)	<0.05
– dry	2 (6.7)	4 (5.0)	>0.05
– wet	26 (86.6)	9 (11.3)	<0.05
– productive	17 (56.6)	9 (11.3)	<0.05
– unproductive	10 (33.3)	-	<0.05
– paroxysmal	1 (3.3)	4 (5.0)	>0.05
– no cough	2 (6.6)	-	>0.05
– in the morning	17 (56.6)	9 (11.3)	<0.05
– in the evening	2 (6.6)	-	>0.05
– during the day	10 (33.3)	4 (5.0)	<0.05

– at night	12 (40.0)	2 (2.5)	<0.05
– painful	-	-	-
– unpainful	28 (93.3)	-	<0.05
– with vomiting	-	-	-
Dyspnea:			
– at rest	16 (53.3)	-	<0.05
– during exercise	28 (96.6)	-	<0.05
Hyperthermia:			
– hectic	-	-	-
– high	-	-	-
– low-grade pyrexia	5 (16.6)	12 (15.0)	>0.05
Weakness	13 (45.0)	15 (18.8)	<0.05
Loss of appetite	17 (56.6)	18 (22.5)	<0.05
Catarrhal symptoms	6 (20.0)	18 (22.5)	>0.05
Sleep disorders	9 (30.0)	5 (6.3)	<0.05

Notes. 1. The data are presented in total numbers, the percentage is given in brackets.

2. P – the probability of differences between patients with recurrent and chronic bronchitis.

Thus, in remission CB was accompanied by severe asthenization of patients who complained of general weakness ($p<0.05$), loss of appetite ($p<0.05$), rapid fatigability, sleep disorders ($p<0.05$) more than children with RB. Children often associated sleep disturbances with the presence of night cough and dyspnea, feeling short of breath. Such multiform complaints in remission significantly aggravated the quality of life of patients and their families, led to an increase in absence from school.

Remission period was more favorable in patients with RB. Some patients did not have any complaints during this period and some of them had minimal complaints.

Cough occurred in 16.3% patients with RB and 93.3% with CB ($p<0.05$) in remission. The cough was slightly different. Thus, it occurred in the morning and was hyperactive in children with RB (in response to a sharp change in the temperature regime, physical activity, inhaling irritating substances etc.). Children with CB suffered from more symptomatic not productive cough with viscous mucus; it was obsessional, accompanied by dyspnea and chest discomfort.

Discussion of the results

The clinical course of recurrent bronchopulmonary pathology in children is very diverse ranging from symptomatic forms to slow-grade oligosymptomatic forms. However, despite polymorphism of manifestations or their absence, we identified a number of symptoms either isolation or in combination in cases of bronchopulmonary diseases with a tendency to relapse. In particular, clinical signs of non-specific intoxication syndrome (temperature increase, general weakness, loss of appetite, rapid fatigability), respiratory failure and cough were observed in such children. These data were consistent with results of other researchers. However, some differences in the clinical picture clearly defined by nosology option and period of disease (exacerbation or remission) were still present. Such knowledge will allow us to apply a differentiated approach to treatment and to prevention of patients with different clinical bronchitis.

Conclusions

1. The level of bronchopulmonary pathology among children ranged from 15 to 50%. Ambiguous prognosis (tendency to relapse, process chronization) occurred very often justifying medical and social significance of the problem.
2. Clinical features of bronchitis with recurrent and chronic course in children were defined and their clear dependence on the stage of disease was shown. Cough (90.0%), intoxication (85.0%), general weakness (63.3%), loss of appetite (50.0%), low-grade pyrexia prevailed in children with recurrent bronchitis in the exacerbation period. Children with chronic bronchitis in the exacerbation period often complained of cough (100.0%), dyspnea (83.3%), general weakness (76.6%), low-grade pyrexia (73.3%), loss of appetite (60.0%) and sleep disturbances (56.6%).

3. Remission in children with CB was accompanied by more significant manifestations of respiratory failure asthenization in patients than in patient with RB. Main symptoms included general weakness ($p<0.05$), loss of appetite ($p<0.05$), rapid fatigability, sleep disturbances ($p<0.05$) that significantly impaired patients' quality of life.
4. Main clinical determinants of recurrent bronchopulmonary diseases should be clearly specificated in practice. This will allow to diagnose the disease timely and to conduct an effective treatment, relapse prevention and the progression of the pathological process.

Prospects for further research involve the study of differential clinical and functional characteristic, analysis of the risk factors and basic diagnostic approach in children with recurrent and chronic bronchitis.

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